

NRO review completed

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18 March 1963

**MEMORANDUM FOR : Deputy Director (Research)**  
**SUBJECT : Itek Proposal for Environmental Photo-graphic Evaluation Facility**

1. Itek is proposing to construct a facility to permit environmental and optical testing of satellite cameras as described in the attached brochure. This facility would be capable of testing of systems in the M2, E-6, and possibly LANYARD category, but would not be adequate for valid optical testing of L<sup>1</sup> (150" focal length) cameras.

2. Approval of this proposal should be contingent on approval of the M2 (1 meter focal length) camera development and even then certain negotiations should be undertaken with Itek in regard to price, provision for expansion to accomodate more advanced cameras, etc.

3. Itek now use a 60" collimator with 12" aperture to perform optical testing of MURAL cameras. Vibration, thermal, and vacuum tests are done on other facilities for these purposes.

4. In addition for special one time tests a small vacuum chamber is available which can be used with a rather low quality collimator mounted externally. The vacuum chamber is not mounted on a seismic block, therefore, measurements made by this apparatus are subject to extraneous vibrations as well as atmospheric and window distortions in the optical path.

5. Elsewhere in the MURAL program chain of test facilities are a 60" focal length 12" aperture collimator used to check optical performance only at sea level ambient conditions at the



6. So far as I am informed, only a 16" focal length collimator is available at Vandenburg for ARGON camera evaluation. A dynamic resolution test facility for LANYARD

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consisting of a seismic block mounted 200" collimator with 18" aperture for optical testing is also located at [redacted] and a 300" focal length 13" aperture collimator is floating unused somewhere in the logistics system. This latter would be too small in aperture for fully satisfactory testing of an L<sup>1</sup> camera however.

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7. Itek are using a 200" focal length 15" aperture collimator for dynamic resolution tests of LANYARD. This apparatus is reported by Itek to be fully utilized for the next 12-14 months and is located a plant removed from the MURAL work. Security restrictions were involved at the beginning of LANYARD which makes common use of facilities difficult to impossible.

8. By way of further background, Fairchild installed a test chamber at a time when they were involved in both CORONA and ARGON programs. This was paid for by Fairchild with government funds covering only special equipment peculiar to ARGON testing. This will be described later in some detail.

9. Eastman Kodak have a great variety of test facilities, but none capable of tests in combination as proposed by Itek. Eastman Kodak have put together test apparatus on a program by program basis as the needs arose.

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10. There are also facilities at Wright Field which at present are not known by me in detail, but which do permit environmental testing. The capacity of existing facilities are marginal for M2 and LANYARD type cameras and definitely insufficient for better cameras.

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12. In addition to the security problems involved with use of "open" facilities for "black" programs, there is also a scheduling problem since some degree of equality among contractors use must be granted. This is historically true in government facilities for testing engines, aircraft, and other components. The usual result is that a contractor can get his product tested in such facilities on a one time basis, usually much later than he would want, but never for production testing on an accelerated basis.

13. One can also argue the need for production testing of each unit on such elaborate facilities vs one-time qualification testing so done and production tests made on suitable but separable other facilities.

14. Returning to the technicalities of the Itek proposal the following items are summarized in comparison to the FCIC test facility:

	ITEK	FCIC
Chamber test volume	11' diam x 14'	15'x13'x14'
Vacuum	$1.10^{-7}$ mm Hg.	$1.10^{-7}$ mm Hg.
Temperature	00-200°F	-100°+200°F
Vibration	5-2000 cps	N.A.
Collimator		
Focal length	100"	288" 72"
Aperture	12"	36" N.A.
Resol. limit	$10/770$ l/mm	N.A. N.A.
Isolation block	$0.9 \times 10^6$ lbs.	N.A. N.A.
Acoustic test chamber	None	6'x6'x6'

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**Costs**

Building  
Collimator  
Vibration equip.  
Vacuum equip.  
Misc. equip.

Total

Fee

Total

Gov't. contribution for  
special glass

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A substantial part, if not all, of the cost difference is represented by the collimator installations. The Fairchild facility would be not quite ideal, but certainly useful for evaluation of cameras up to L<sup>1</sup> variety. Use of this facility by Itek for an M2 development would involve a scheduling problem with FCIC, the owner; a security argument; plus the usual corporate jealousies and arguments over accuracy of equipment, test personnel competence, etc.

15. Itek have told me informally that given a partial commitment on M2 to cover, glass, lens manufacture, film transport mechanism, etc., they would also require partial coverage on the facility to cover collimator design, building design, and some long term purchases

16. I would suggest calling Itek in to negotiate the following:

- a. Absorption of substantial part of total cost by Itek at very minimum to include building and seismic block.
- b. Provision for collimator suitable for L<sup>1</sup> systems.
- c. Extent of partial coverage needed on presumption of partial commitment for M2.

17. Related to this last point LMSC have reported to SSD that they would require  over five months for design work on M2 system. LMSC also estimate on behalf of Itek  over eight months to buy four sets glass, design and make two lenses, design work and functional mockup. This is said by Lockheed to preserve first 90 day lead after which additional commitments would be needed.

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This does not include my own view that GE should begin initial work on enlarged capsule to accommodate wider film of M2 in adequate quantity and LMSC Agena stability improvement although these are separate negotiations.

18. One other technical point in the proposal should be discussed with Itek, i.e., target drive is to be constant to  $\pm 2\%$  of desired velocity. The adequacy of this requires defense in view of Itek claims of  $\pm 1\%$  accuracy in automatic LMC systems and  $\pm 0.1\%$  accuracy in laboratory systems.

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19. Over and above all this a discussion of the testing philosophy to be followed in the future, location, ownership, and capacity of test facilities might well be a matter of NRO study and decision by yourself and Dr. McMillan.

**EUGENE P. KIEFER**  
Technical Analysis and Evaluation Staff  
(Special Activities)

**Attachment:**  
**Brochure**

**E.P. Kiefer/TAES/OSA** ☐ (18 March 1963)

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